

# **REGARD® 3900**

## **Instructions for use**

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# 1

## Safety-related information

- Before using this product, carefully read these instructions for use and those of the associated products.
- Strictly follow the instructions for use. The user must fully understand and strictly observe the instructions. Use the product only for the purposes specified in the intended use section of this document.
- Do not dispose of the instructions for use. Ensure that they are stored and used appropriately by the product user.
- Only trained and competent users are permitted to use this product.
- Do not use a faulty or incomplete product. Do not modify the product.
- Notify Dräger in the event of any component fault or failure.
- Comply with all local and national rules and regulations associated with this product.
- Only trained and qualified personnel are permitted to inspect, repair and service the product as detailed in these instructions for use (see "Maintenance", page 38). Further maintenance work that is not detailed in these instructions for use must only be carried out by Dräger or personnel qualified by Dräger. Dräger recommend a Dräger service contract for all maintenance activities.
- Use only genuine Dräger spare parts and accessories. Otherwise, the proper functioning of the product may be impaired.

### Safe coupling with electrical devices

Electrical connections to devices which are not listed in these instructions for use should only be made following consultation with the respective manufacturers or an expert.




### Use in areas subject to explosion hazards

Devices or components for use in explosion-hazard areas which have been tested and approved according to national, European or international explosion protection regulations may only be used under the conditions specified in the approval and with consideration of the relevant legal regulations. The devices or components may not be modified in any manner. The use of faulty or incomplete parts is forbidden. The appropriate regulations must be observed at all times when carrying out repairs on these devices or components.


## 2 Conventions in this document

### 2.1 Meaning of the warning notices

The following warning notices are used in this document to alert the user to potential hazards. The meanings of the warning notices are defined as follows:

Warning sign	Signal word	Classification of the warning notice
	DANGER	Indicates an imminently hazardous situation. If not avoided, it will result in death or serious injury.
	WARNING	Indicates a potentially hazardous situation. If not avoided, it could result in death or serious injury.
	CAUTION	Indicates a potentially hazardous situation. If not avoided, it could result in physical injury. It may also be used to alert against unsafe practices.
	NOTICE	Indicates a potentially hazardous situation. If not avoided, it could result in damage to the product or environment.

### 2.2 Typographical conventions

<b>Text</b>	Texts that are bold indicate labelling on the device and screen texts.
►	This triangle in warning notices indicates the possibilities for avoiding danger.
>	The greater than symbol indicates a navigation path in a menu.
	This symbol indicates information that facilitates the use of the product.

### 2.3 Trademarks

Trademark	Trademark owner
REGARD®	Dräger
HART®	HART Communication Foundation
Microsoft®	Microsoft Corporation
Windows®	Microsoft Corporation

### 3 Description

#### 3.1 Feature description



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The Dräger REGARD® 3900 series is a group of control units for continuous monitoring of up to sixteen 4–20 mA remote sensor transmitters, in order to warn against potentially dangerous or harmful conditions.

The series includes the REGARD® 3900, 3910 and 3920. The REGARD® 3900 and 3920 are closed wall enclosures; the REGARD® 3910 is a modular system, which needs to be installed in a rack-based system. For further information see: "REGARD® 3910", page 17.

The control unit monitors the electrical signals from the remote sensor transmitters to the input channels and emits warning messages if alarm and fault conditions occur. For each input channel, alarms for up to three different gas concentrations (A1, A2 and A3) and two fault conditions (F1 and F2) are available. Potentially dangerous or noxious gases can be displayed on the transmitter by setting alarm thresholds for the gas concentrations. Depending on the configuration, the alarms are activated when the monitored concentrations increase or decrease. The faults (F1 and F2) are triggered when the transmitter emits the corresponding fault signal (F2 is only used if the transmitter emits a second fault signal). The combination of internal evaluation module (input modules, relay modules and output modules) as well as the settings of the control unit can be adapted to the respective gas detection and warning requirements. In addition, warning devices used with the control unit can be selected and configured by the user as required. The control unit of the REGARD® 3900 series is configured using a Microsoft Windows®-based software programme. The REGARD® 3920 also features a built-in configuration menu.

## 3.2 Intended use

The REGARD® 3900 control units are used with 4–20 mA transmitters to provide stationary, continuous monitoring of flammable or toxic gases and vapours as well as oxygen deficiency or surplus. The control unit is primarily intended for use as part of a gas detection system, but can be used with each remote sensor transmitter with 4–20 mA source output. This document describes the REGARD® 3900 series for use as a control unit for a gas detection system. The control unit is designed for use in private and public facilities as well as in light industry to provide the

- Output of measured values via the display.
- Output of visual and acoustic alarm messages at the control unit and external warning devices.

## 3.3 Limitations on use

The control unit is not intended or permitted for use in areas where flammable or explosive gas mixtures can develop.

The control unit cannot be used with 3-wire transmitters with a 4–20 mA sink output.

## 3.4 Approvals

The REGARD® 3900 control unit is certified in accordance with Directive 2014/34/EU (ATEX Directive) for operation with approved 4–20 mA transmitters (EC type examination certificate TÜV 19 ATEX 8400 X).

The REGARD® 3900 control unit is certified with regard to the measuring function for explosion protection.

Output modules are not part of the ATEX EC type examination of the REGARD® 3900. Output modules must not be used for counter measures against explosion hazards.

### **Special conditions for safe use according to EC type examination certificate TÜV 19 ATEX 8400 X**

- Only remote sensor transmitters with a valid and suitable ATEX certificate for safety and measuring performance may be connected to this evaluation system. These connections can be made via ATEX-certified safety interface barriers.
- Any cable used for the interconnection of remote sensor transmitters must be selected so that its resistance does not have any adverse effects on the functional integrity of the controller.

### **Requirements of EN 60079-29-1**


When using a control unit from the REGARD® 3900 series to detect combustible gases as protection against explosion hazards, at least one gas alarm relay must be set to latching. (See EN 60079-29-1 Potentially explosive atmospheres - Gas detectors - Requirements for the operating behaviour of devices for measuring combustible gases.)




**Markings**

CE mark of conformity:



ATEX marking:  II (2) G

 Using a power supply unit (PSU) which is not provided or installed by Dräger, may require a reassessment of the compliance of the control unit with the EMC Directive and/or the RoHS directive.

## 4 Components

### 4.1 General instructions

The control unit has a display PCB and up to six control modules. The control modules are a combination of input modules, relay modules and output modules, which can be flexibly arranged as far as the control unit allows this. Internally, all control modules and the display PCB are connected using a ribbon cable.

The control unit can be supplied from an AC or DC power source or both. Irrespective of the power supply to the control unit, the internal control modules receive a 24 V DC supply.

The following internal LEDs are in operation during use:

- There is a green LED on each control module to indicate that the internal DC voltage is being applied.
- Two red LEDs on the right side of the display PCB and on each control module flicker during normal operation.
- In addition to each relay on an input module or relay module, a red LED lights up when the relay is activated.

### 4.2 Display PCB

The display PCB is inside the control unit and houses the display screen and the LEDs on the front panel. The display screen and the LEDs provide information and warning messages relating to the statuses measured at the remote sensor transmitters. The inhibit switch and the contrast setting are also found on the display PCB.

#### 4.2.1 Inhibit switch

The inhibit switch is used during maintenance or repair work on the control unit to maintain the current status of the control unit relay; this prevents the gas warning messages from being activated. The inhibit switch operates as follows:

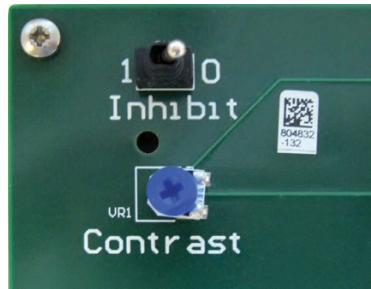
Position	Effect
0	All relays are operating normally
1	Relays whose feature is "Alarm locked" are activated (associated remote warning devices are also activated). All other relays remain in their current state. The inhibit LED lights up. The active LEDs flash and the acoustic alarm sounder beeps every 30 seconds. The signals of the output modules are frozen in their current state.

#### **WARNING**

If the inhibit switch is moved to position 1, the control unit relays remain in their current status and the gas value warning messages cannot be activated.

- Always bring the switch back to position 0 after maintenance or repair work.

## 4.2.2 Contrast settings



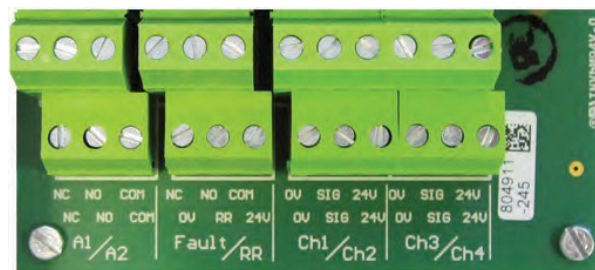
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To adjust the contrast, turn the control using a suitable screwdriver. The LCD screens are temperature-sensitive and therefore adjustment is necessary in very cold or very hot environments.

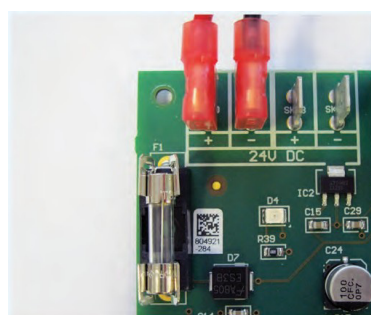
## 4.3 Input module

An input module has four channels; each of which allow the current signal from a remote sensor transmitter to be monitored. For each channel, alarms for up to three gas values (A1, A2 and A3) and two fault conditions (F1 and F2) are available. Potentially dangerous or noxious gas values can be displayed on the transmitter by setting alarm thresholds for the gas values. Depending on the configuration, the alarms are activated when the monitored gas values increase or decrease. The faults (F1 and F2) are triggered when the transmitter emits the corresponding fault signal (F2 is only used if the transmitter emits a second fault signal).

Each input module has three relays, which are activated as soon as an F1 (Fault 1), A1 (pre-alarm) and A2 (main alarm) signal is received from one of the channels monitored by the PCB. The relay is a zero potential, single pole changeover relay which can be used to activate external warning devices. The backup on the input module protects the module against short circuits to the input channels (Ch1 to Ch4).



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The input module terminals are:

- Ch1 to Ch4 are channels for 4–20 mA remote sensor transmitters in 2- or 3-wire technology.
- A1, A2 and Fault (F1) are terminals for the input module relays.
- RR are the terminals for remote acknowledgement, via which a switch that is normally open is connected outside the control unit, which has the same purpose as the button **Acknowledge/OK**.

During installation, each input module is configured with another module number (1–4) to define the channel numbers (1–16) within the evaluation system. For further information see: "Numbering the control modules", page 21.

Each input module requires a 24 V DC supply via cable, which is provided together with the module. For further information see: "Connecting control modules and display PCB", page 23.

### 4.3.1 Input module relay settings

The settings for the input module relays are preset or can be defined during the configuration as follows:

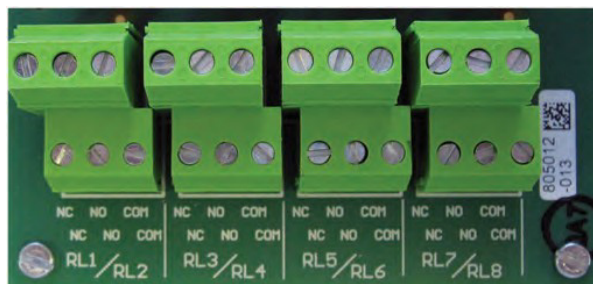
- All input module relays are non-acknowledgeable.
- The A1 and A2 relays are activated in the event of an alarm.
- The F1 relay normally has current flowing through it and is tightened (normally energized). In the fault-free operating state (power supply present), NC and COM are connected. Drop-out in case of fault, e.g.: Supply voltage is less than 6 V.
- Each relay can be set as latching or non-latching during the configuration.

## 4.4 Relay module

A relay module is used for the activation of external warning devices (alarms, fans or other safety equipment), if the REGARD® 3900 control unit records alarm or fault conditions. The module has eight zero potential, single pole changeover relays, one of which is a non-configurable system fault relay (RL1) and seven of which are configurable relays (RL2 to RL8).

RL1 to RL8 are the terminals for the relay module relays.

During installation, each relay module is configured with another module number (1 or 2) to define the relay numbers (1–16) within the evaluation system. For further information see: "Numbering the control modules", page 21.



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#### 4.4.1 Relay module relay settings

RL1 is used to display a system fault. For example: RL1 is deactivated if the ribbon cable from the relay module is disconnected or if an F1 fault signal is received from a remote sensor transmitter of the system. RL1 is preset to:

- Feature: Common alarm F1
- Activated in normal operation
- Latching
- Non-acknowledgeable

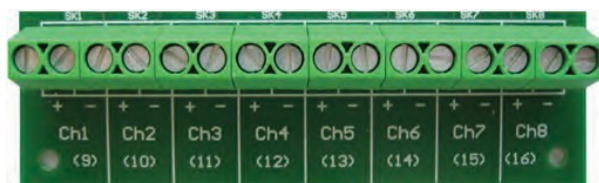
The other seven relays can be set as follows in the configuration:

- Feature: see table below
- Activated in normal operation or activated in event of alarm
- Latching or non-latching
- Acknowledgeable or non-acknowledgeable

Feature	Changes the status, if
Common alarm A1	A1 is triggered on a channel
Common alarm A2	A2 is triggered on a channel
Common alarm A3	A3 is triggered on a channel
Common alarm F1	F1 is triggered on a channel
Common alarm F2	F2 is triggered on a channel
Common alarm A1, A2 or A3	A1, A2 or A3 is triggered on a channel
Single alarm A1	A1 is triggered on a specific channel
Single alarm A2	A2 is triggered on a specific channel
Single alarm A3	A3 is triggered on a specific channel
Single alarm F1	F1 is triggered on a specific channel
Single alarm F2	F2 is triggered on a specific channel
Group alarm A1	A1 is triggered on a certain number of channels in a group
Group alarm A2	A2 is triggered on a certain number of channels in a group
Group alarm A3	A3 is triggered on a certain number of channels in a group
Group alarm F1	F1 is triggered on a certain number of channels in a group
Group alarm F2	F2 is triggered on a certain number of channels in a group
Alarm lock	The inhibit switch on the display PCB is moved to position 1
No function	No change of state of the relay

#### 4.5 Output module

Using an output module, the current signals that are received from the remote sensor transmitters are sent to an external monitoring device or system. This module has eight output channels (Ch 1–8), which are assigned to the signals from the input channels of the control unit (either Ch 1–8 or Ch 9–16). For further information see: "Numbering the control modules", page 21.



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+ signal - 0 V

The input channel signals duplicate the signal outputs and 0 V but are electrically isolated from the input channels. The signal outputs are current sources that only work if they are connected to a passive load.

Input signal (mA)	Reading on the display (range 0–100)	Output channel signal (mA)
Below 3.8	Under-range or maintenance	As input signal
3.8 to 4.2	0	4.0 (zero terminal <sup>1)</sup> )
4.3	2	4.3
12	50	12
20	100	20
Over 20	Over-range	As input signal
Input channel is inactive	Display blank	0

1) The zero terminal provides a 4 mA output signal for very low gas values of  $\pm 2\%$  of the measuring range.

### Alarm lock

If the inhibit switch is moved to position 1, the output signals are frozen in their current state.

If the inhibit switch is moved back to position 0, the output signals return to their normal state.

### Output module fault

In the event of a fault on the output module, all channels have an output signal of 1 mA ( $\pm 0.3$  mA).

## 5 Installation & commissioning

### 5.1 General instructions

The following general instructions should be observed for all installation, repair or maintenance work on the control unit. Information about the transmitters and sensors can also be found in the "Instructions for Use" of the remote sensor transmitter.

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#### **WARNING**

##### **Risk of electric shock!**

A non-interrupted power supply can result in personal injury and/or damage to the control unit, the remote sensor transmitter or the cable.

► Before installation, repair or maintenance work on the control unit, disconnect or shut down all AC and DC power supplies to the control unit.

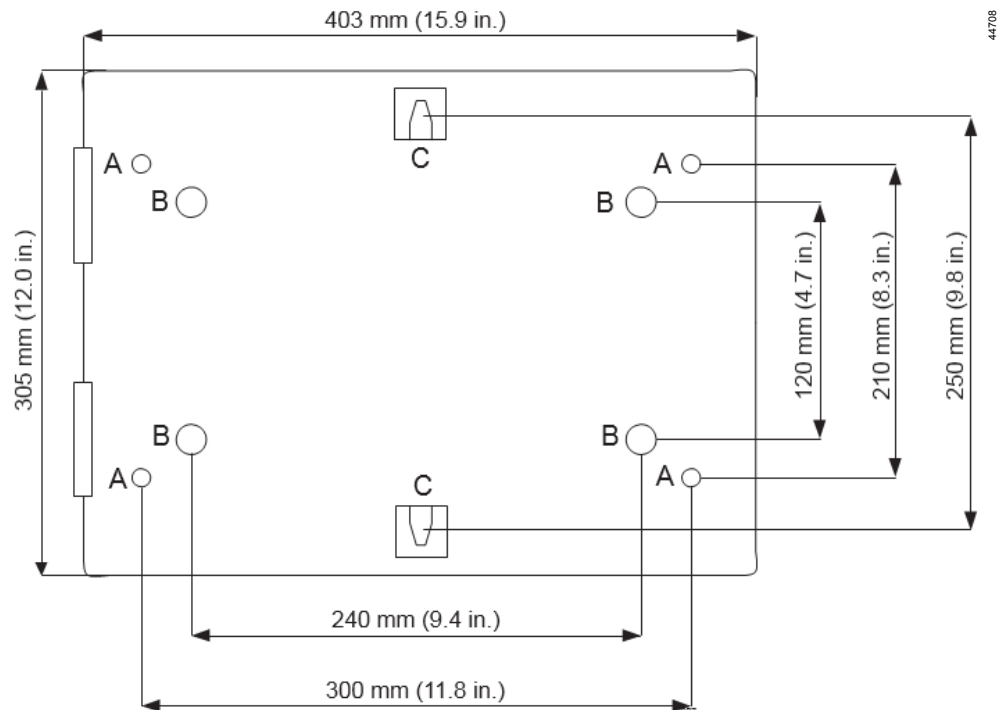
- 
1. Disconnect or shut down all AC or DC power supplies to the control unit.
  2. Remove the two screws from the cover (5 mm hexagonal key) and open the front cover.
  3. Carry out the necessary installation, repair or maintenance work.
  4. Check the sealing ring and close the front cover.
  5. Insert the two screws into the cover and secure.

### 5.2 Positioning and mounting the control unit

Follow the following instructions for the installation location:

- Mount the control unit where that it is easily accessible and the display and readings are clearly visible.
- Avoid areas where excessive vibrations (frequency above 55 Hz or amplitude above 0.15 mm) can occur.
- Avoid areas where highly aggressive or corrosive gases, dirt or contaminants can damage the electronics.
- Temperature conditions: 0 to 55°C.
- Relative humidity: REGARD® 3900/3920 - 0 to 100%, non-condensing; REGARD® 3910 - 0 to 95%, non-condensing.

## 5.2.1 REGARD® 3900 and 3920



A	M6 x 10 mm threaded hole
B	Mounting hole
C	Suspension

Mounting diagram (not to scale)

The console requires a free space of at least 50 mm on the left-hand side so that the front cover can be opened. Dräger recommends a free space of at least 50 mm around the entire console.

### NOTICE

#### Damage to the device!

- If the control unit is mounted using the mounting holes (B), remove all the control modules to prevent damage when drilling the holes in the panel.
- Observe the usual precautions when drilling into walls or other structures to prevent damage to existing cables, gas pipes or water pipes etc.

Mount the console as follows:

1. Use M6 threaded holes (A) or the suspension (C) to retain the protection class of the console (IP 65).
2. Use a 5 mm drill bit to drill through the mounting holes (B). Drilling the mounting holes reduces the protection class.
3. A mounting bracket that retains the protection class of the console is available at Dräger. The mounting bracket is supplied together with the screws and washers required for mounting the bracket to the threaded holes (A) on the back of the console.



### 5.2.2 REGARD® 3910

The REGARD® 3910 control unit is a modular system which needs to be installed in a rack-based system, e.g. in the REGARD® 3910 aisle installation kit. When mounting in a rack-based system, the regulatory requirements for electromagnetic compatibility (EMC) and electrical safety must be met.

## 5.3 Cable entry


### NOTICE

#### Damage to the device!

- ▶ Do not attempt to knock out the cable entries as this will damage the housing. Take care when cutting the cable entries so that internal components and cables are not damaged. If necessary, remove control modules to avoid damage.
1. Choose the cable hole at the top or bottom of the housing that is located next to the cable connections in the console.
  2. Use an M20 hole cutter to cut out the pre-marked cable opening.
  3. Feed in the cable and use an M20 cable plug to seal the cable entry and prevent the ingress of moisture.

## 5.4 Grounding plate for the cable shielding

A grounding plate for connecting the cable shielding in the console of the REGARD® 3900 and 3920 with earth is available from Dräger. If the grounding plate is used, connect it to an external low-resistance earth using a braided cable with a large cross-section.

 The grounding plate is not required for the control unit to meet the EMC Directive.

## 5.5 Power supply

The external power supply to the control unit is made via an AC or DC power source, or both. If both are used, the DC power supply source acts as a supporting supply. It can be a 24 V DC power supply or a 24 V rechargeable battery. For specifications and tolerances for the AC and DC power sources, refer to the technical data.

For applications in accordance with Directive 2014/90/EU, the ferrite (order no. 83 28 267) must be installed on the cable from the power supply according to the figure.



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### 5.5.1 AC power supply

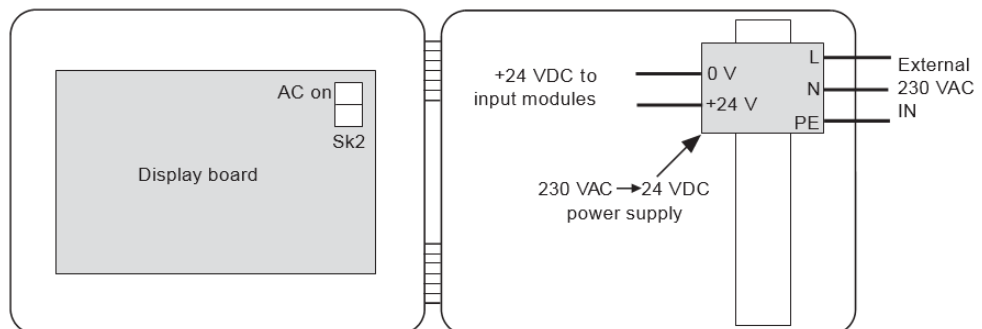
**i** If the internal 24 V DC power supply unit is not provided by Dräger, it must be ensured that the requirements of the EMC (electromagnetic compatibility) Directive and the Low Voltage Directive have been met. The power supply unit must comply with the following EMC standards - Immunity: EN 61000-6-2; Emissions: EN 61000-6-3 or EN 61000-6-4.

If the AC voltage supply comes from an AC power socket, the maximum length of the cable between the socket and the control unit is 3 m.

For the AC voltage supply, use a 24 V DC power supply unit as shown in the image below. The power supply unit should be chosen according to the number of input channels used.

Dräger recommends the following:

- 4 channels - 2 A energy supply unit.
- 8 channels - 5 A energy supply unit.
- 12 or 16 channels - 10 A energy supply unit.



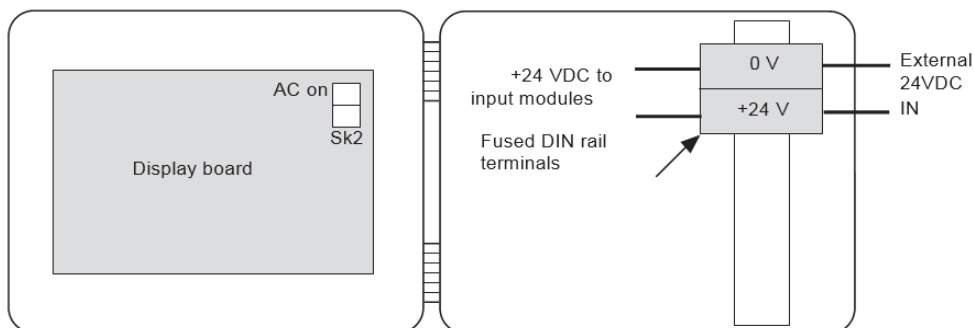
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### 5.5.2 DC supply voltage

To supply the control unit via an external DC power supply:

- Use a regulated, fault-free 24 V DC power supply.
- If it is likely that the supply will be exposed to high levels of conducted RF interference, use a filter to eliminate the interference.

- If the HART<sup>®</sup> diagnostics (Highway Addressable Remote Transducer) can be used with the remote sensor transmitters, the supply must comply with the HART<sup>®</sup> requirements (see Instructions for Use for the remote sensor transmitter).

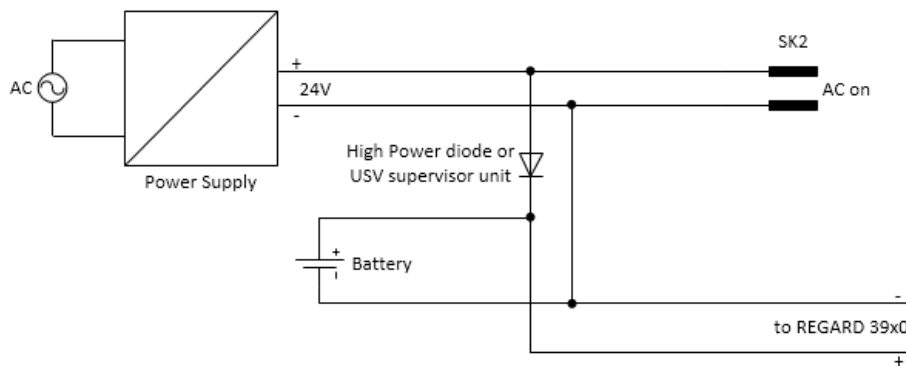


### 5.5.3

#### AC and DC power supply

If both options are used, the AC voltage supply is the primary supply and the DC voltage supply is the supporting supply. Diodes and/or relays may be required in order to switch from the primary to the supporting power supply (see diode circuit).

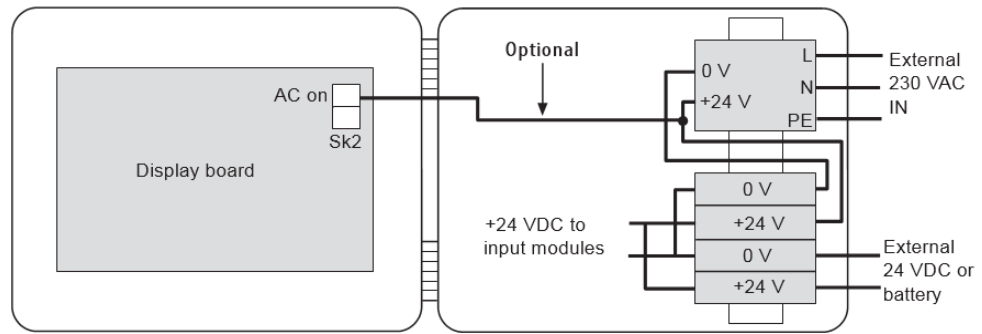
Diode circuit



#### Power AC LED

If the control unit is supplied with both AC and DC power supply, it is best to connect the 24 V output of the energy supply unit to the AC on terminal on the Sk2 of the display PCB. Once a connection has been established, the power AC-LED lights up if the control unit is being supplied via the (primary) AC voltage supply. If the control unit is being supplied via the (supporting) DC voltage supply the LED is off.

**i** A diode is required to protect against power from the backup supply that can incorrectly indicate a functioning AC voltage supply (see diode circuit).



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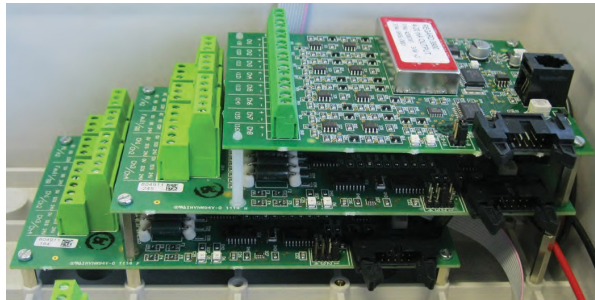
## 5.6 Installation of the control modules

**i** Output modules are not part of the ATEX EC type examination of the REGARD® 3900. If an output module is installed, the control unit must not be used to monitor measures against explosion hazards.

The control unit can contain up to six control modules.

When installing control modules, observe the following:

- Use the short foot screws for the lower level, the long foot screws for the middle level and the long foot screws and plastic spacers for the upper level. (All screws have a M3 thread.)
- Do not connect any control modules outside the operating console of the control unit of the REGARD® 3900 and 3920 series.
- See also the separate assembly instructions supplied for installing the control modules for a REGARD® 3910 control unit.



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### 5.6.1 Combining the control modules

Combining the control modules must meet the following requirements:

- Max. 6 control modules (input, relay and output modules together)
- Max. 4 input modules
- Max. 2 relay modules
- Max. 4 input modules and relay modules together
- Max. 4 output modules

The table below shows the combinations. For example, if you use the highlighted table row, the control unit could include the following modules: 3 input modules (up to 12 input channels), 1 relay module (up to 8 relays), two, one or no output modules (16, 8 or 0 output channels).

Input module	Relay module	Max. number of output modules
4	0	2
3	1	2
3	0	3
2	2	2
2	1	3
2	0	4
1	2	3
1	1	4
1	0	4

## 5.6.2 Numbering the control modules

### WARNING

The renumbering of an input or relay module (by repositioning the jumper on the module) after configuring the control unit can cause alarms to not be activated as desired.

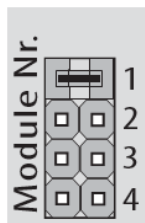
- If an input or relay module is renumbered, configure the control unit to ensure that the alarms are activated as desired.

### Input modules

Place a jumper on the appropriate "Module no." terminals on the input module to determine the channel numbers in the REGARD® 3900 system.

When numbering the input module, the following should be noted:

- Each input module within the control unit must have another module number (1 to 4).
- If only one module is installed, assign the number 1.
- All modules must be numbered consecutively, otherwise problems may occur during the configuration of the system.



Position of the jumper	Channels
1	1–4
2	5–8
3	9–12
4	13–16

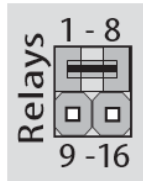
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### Relay modules

Place a jumper on the appropriate "Relays" terminals on the relay module to determine the relay numbers in the REGARD® 3900 system.

When numbering the relay module, the following should be noted:

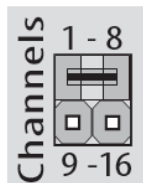
- If only one relay module is installed, place the jumper at position 1–8.
- If a second relay module is installed, place the jumper at position 9–16.



Position of the jumper	Relay on the module	Number in the system
1–8	RL1	1
	RL2	2
	RL3	3
	RL4	4
	RL5	5
	RL6	6
	RL7	7
	RL8	8
Position of the jumper	Relay on the module	Number in the system
9–16	RL1	9
	RL2	10
	RL3	11
	RL4	12
	RL5	13
	RL6	14
	RL7	15
	RL8	16

### Output modules

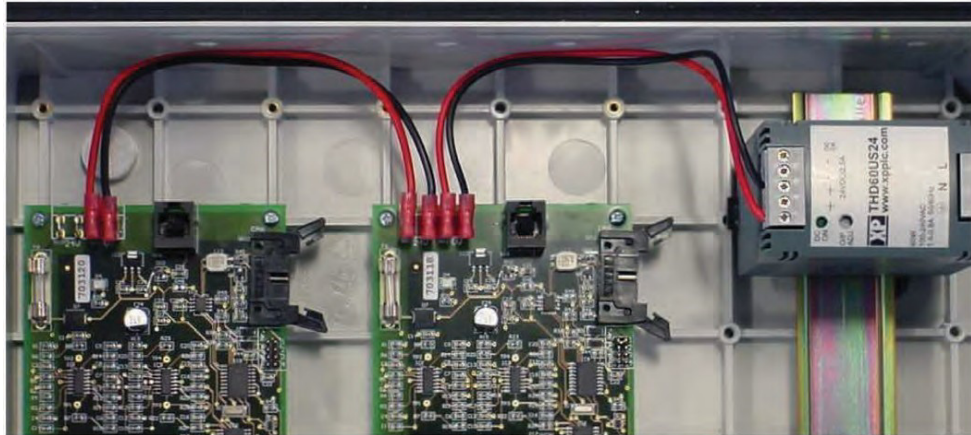
Place a jumper on the appropriate "Channels" terminals on the output module to determine the channel outputs: 1–8 or 9–16. The same channels can be determined for two or more output modules if necessary.



### 5.6.3 Connecting control modules and display PCB

#### 24 V DC power supply for the input module

Connect all input modules to the DC voltage supply using the cable supplied. Connect the first input module using the long cables (energy supply unit) and connect all of the following input modules in parallel using the short cables (module to module).




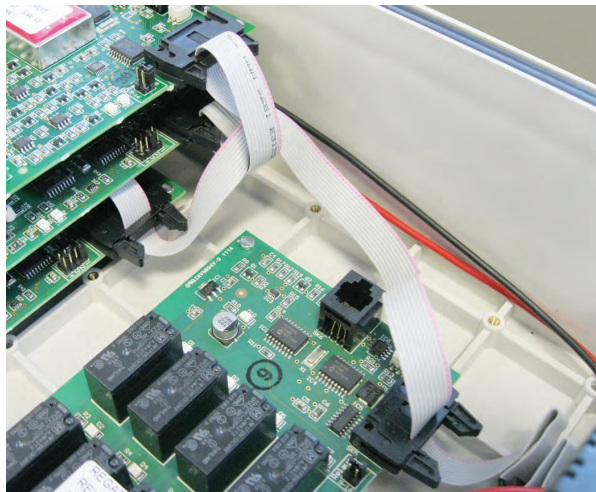
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#### Ribbon cable

Connect the standard ribbon cable to the display PCB and to all control modules.

The display PCB, relay modules and output modules do not need a separate DC power supply.

 For the REGARD® 3910, non-standard cable lengths are available at Dräger. The maximum permissible length of the ribbon cable is 2 m.



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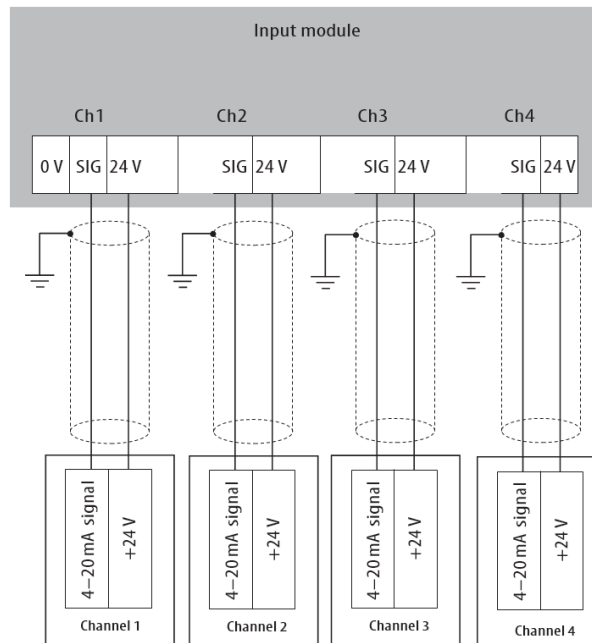
## 5.7 Connecting remote sensor transmitters

The wiring diagrams in this chapter show the general wiring for remote sensor transmitters. Specific details on the remote terminals, including terminal marking, colour coding, labelling, etc., can be found in the Instructions for Use for the remote sensor transmitter.

The following is to be observed for all transmitter types:

- The cable cross-section for connecting the transmitter is limited to a maximum of 2.5 mm<sup>2</sup> and 0.5 mm<sup>2</sup>.
- Use a shielded cable if this is required for the transmitter.

### 5.7.1 4–20 mA two-wire transmitter



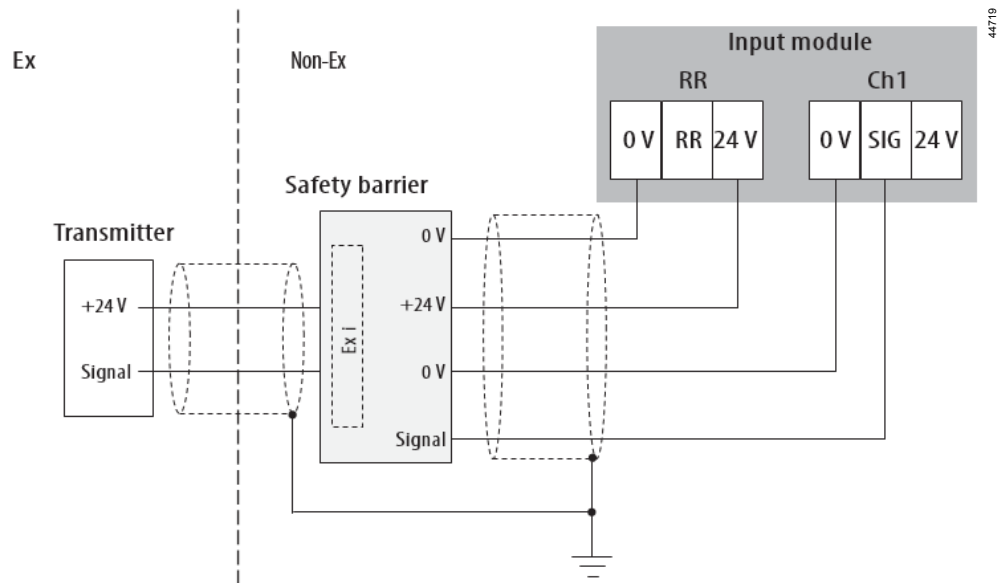
Combining the control modules must meet the following requirements:

- Max. 6 control modules (input, relay and output modules together)
- Max. 4 input modules
- Max. 2 relay modules
- Max. 4 input modules and relay modules together
- Max. 4 output modules

### 5.7.2 4–20 mA two-wire transmitter with safety barrier

See also the instructions for safety barriers and transmitters for the connections between the transmitter and barrier, as well as for the earth connection of the barrier.





### 5.7.3 4–20 mA three-wire transmitter

- Only connect transmitters with a 4–20 mA source output. REGARD® 3900 cannot be used with a three-wire transmitter with a 4–20 mA sink output (if necessary, use a sink-source converter).
- The module can supply a three-wire transmitter with up to 400 mA.
- Use a cable in which all 3 wires have the same resistance.
- To ensure that a short circuit between the 4–20 mA signal output and the 0 V duct at the transmitter causes a fault indication at the control unit, the cable resistance must not exceed the value given by the following formula:

$$R_{\text{cable}} = \frac{250 \times I_{\text{fault}}}{I_{\text{txr}}}$$

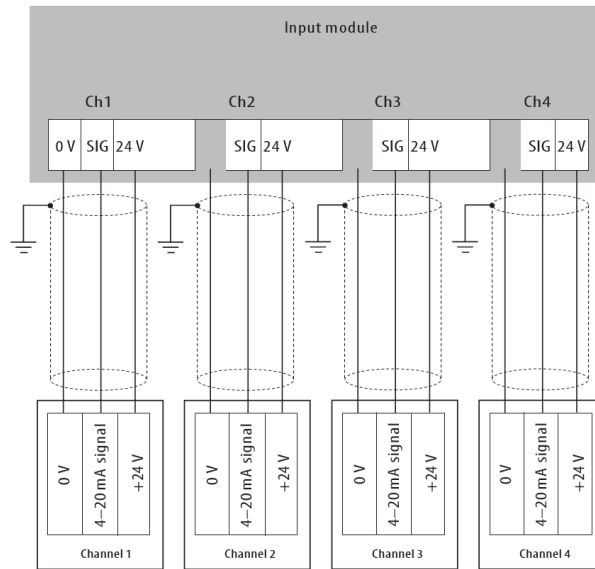
$R_{\text{cable}}$  is the maximum resistance per wire from the control unit to the transmitter (in  $\Omega$ ).

$I_{\text{fault}}$  is the alarm threshold for the fault (in mA).

$I_{\text{txr}}$  is the transmitter operating current (in mA).

Example with a transmitter with an operating current of 100 mA and an alarm threshold for the fault of 3.2 mA.

$$R_{\text{cable}} = \frac{250 \times 3.2}{100} = 8 \, \Omega \text{ per wire}$$



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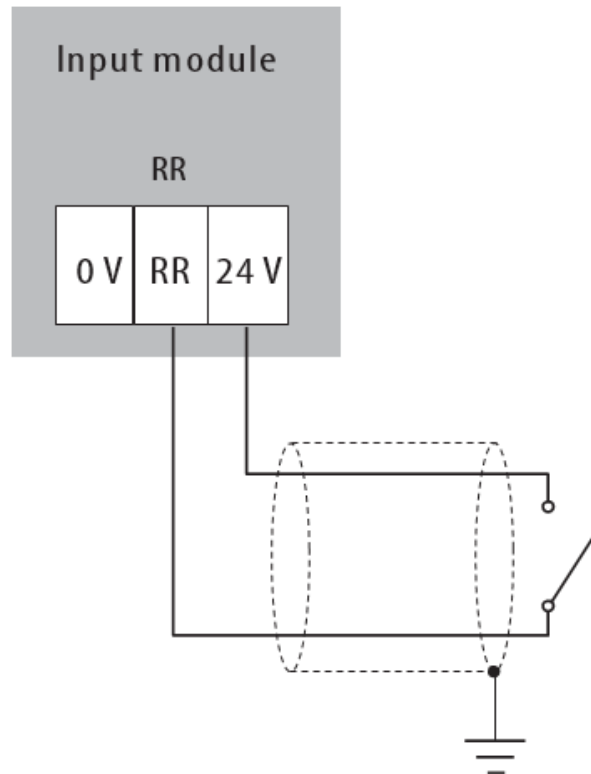
## 5.8 Connecting other external sources

The cable cross-section for external units is limited to a maximum of 2.5 mm<sup>2</sup> and 0.5 mm<sup>2</sup>.

### 5.8.1 Remote acknowledgement

Remote acknowledgement is a switch that has the same functions as the button **Acknowledge/OK**, but outside the control unit. If a remote acknowledgement is required:

- In normal operation, connect an open switch to the terminals for remote acknowledgement (RR) of an input module.
- If there are several input modules installed, it is sufficient to connect the remote acknowledgement switch to only one input module.

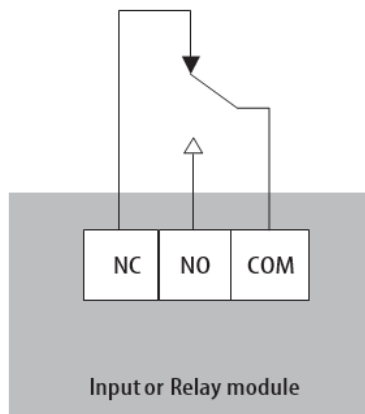


### 5.8.2 Relay terminals (input and relay modules)

With the relay terminals on the input modules (A1, A2 and fault (F1)) and relay modules (RL1 to RL8), a switching function can be provided for remote alarm units such as alarms, fans or other safety equipment. When connecting external units, observe the following:

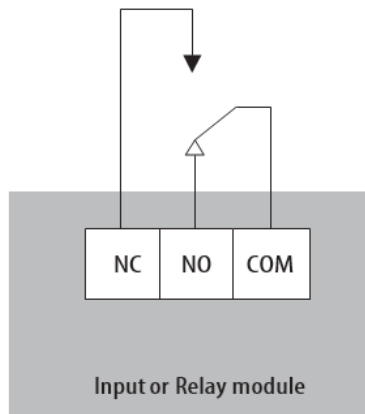
- Rated voltage and nominal current of the relay contacts are shown in the technical data.
- Use shielded or non-shielded cable for the relay outputs.
- If an internal supply is required to operate the external unit, use an output from the power supply unit (PSU).

Alarm activated:



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Normal state activated:

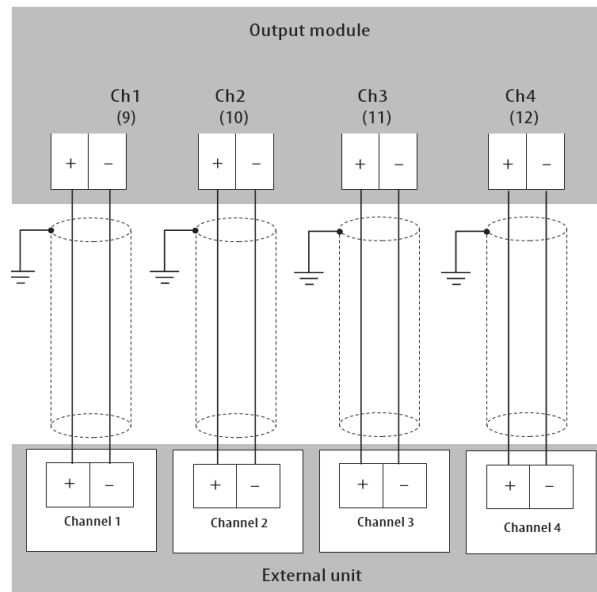


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### 5.8.3 Output module terminals

Using the output terminal module (Ch1 to CH8), the respective signal of the remote sensor transmitter is output to an external monitoring device or system.

- The channel outputs are current sources that only work if they are connected to a passive load.

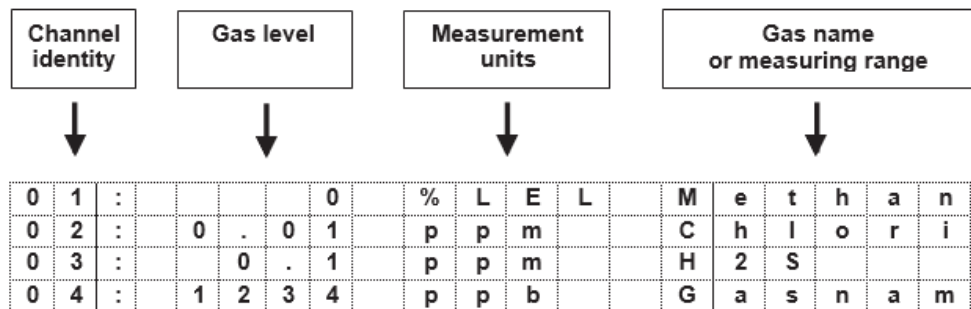


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## 6 Operation

### 6.1 Display screen

The display screen is a backlit LCD display with 20 characters and several rows, which provides information on the gases monitored by the control unit. In the normal gas value display, the screen shows four lines of text.



- Very low concentrations of  $\pm 2\%$  of the measuring range are displayed as zero (this is referred to as a zero terminal).
- The contrast of the display field is adjustable. Contact a trained service technician or Dräger if adjustment is necessary.

#### 6.1.1 Display screen scrolling

The display field shows information from up to four channels at a time. If there are more than four channels installed, the display scrolls to show all channels sequentially.

1. Press Hold / II / ▲ for less than 1 second to freeze the display screen (stop scrolling).
2. Press Hold / II / ▲ again for less than 1 second to unfreeze the display screen (restart scrolling).

#### 6.1.2 Gas type or measuring range

The display screen can toggle between the gas type and the measuring range. By default, the gas type is shown.

- Press Hold / II / ▲ for longer than 1 second to display the full scale.

#### 6.1.3 Over range

If the gas value rises above the measuring range (the transmitter signal rises above 20 mA), **Over-range** is displayed. The over range reading is latching (i.e. it remains on the display even if the gas value falls back into the measuring range).

- Press **Acknowledge/OK** (or if available, carry out a remote acknowledgement), in order to reset the display. If the button is pressed while the gas value is above the measurement range, the display will be reset as soon as the gas value falls back into the measuring range.

### 6.1.4 Under range

If the gas value falls under the measuring range (the transmitter signal drops below 3.8 mA - but this is not a maintenance or fault signal), **Under-range** is displayed.

### 6.1.5 Maintenance

If the transmitter needs to be serviced (the transmitter emits a maintenance signal), **Maintenance** is displayed.

## 6.2 Alarm, fault and activity LEDs

The alarm thresholds and activation modes are adapted to the requirements of the user. The actions and measures to be taken upon activation of an alarm or fault LED must be specified by the person responsible for the gas detection system.

Although there are up to three gas alarms (A1 to A3) and two fault alarms (F1 and F2), the control unit has no LEDs for alarm A3 and fault F2. External warning units can be configured to display alarm A3 and fault F2.

LED		Condition
Alarm A1	Flashes	A1 alarm triggered
	Lights up	A1 alarm acknowledged, however alarm state present
	Off	No alarm state
Alarm A2	Flashes	A2 alarm triggered
	Lights up	A2 alarm acknowledged, however alarm state present
	Off	No alarm state
Fault F1	Flashes	F1 alarm triggered
	Lights up	F1 alarm acknowledged, however fault present
	Off	Channel fault-free
Active	Flashes	Channel active
	Lights up	Alarm lock
	Off	Channel inactive

## 6.3 Power and inhibit LEDs

The power supply to the control unit is made via an AC or DC power source, or both. If both are used, the DC power source (usually a battery system) acts as an emergency power supply if the AC power supply fails.

### Power AC LED

If the control unit uses both AC and DC sources, the connection of this LED is optional. If the LED is connected, it lights up when the control unit is supplied via the (primary) AC power source. The LED is off when the control unit is supplied via the (supporting) DC power source.

### Power DC LED

The LED lights up when the internal modules are supplied with a 24 V DC power supply. (Irrespective of the power supply to the control unit, the internal control modules require a 24 V DC supply.)

### **Inhibit LED**

This LED lighting up indicates that the alarms are locked and therefore the functions of the normal gas value monitoring and warning functions of the control unit are inactive. If the LED lights up, the active LEDs flash and the internal acoustic alarm sounder beeps every 30 seconds. External warning devices that are configured for activation with locked alarms would also be activated.

The alarms are locked when the internal inhibit switch is moved to the maintenance position: This is usually the case during maintenance and repair work on the control unit.

## **6.4 Internal acoustic alarm sounder**

The internal acoustic alarm sounder emits an acoustic warning signal if A1, A2, A3 or F1 is activated (not if F2 is activated). The acoustic alarm sounder beeps every 30 seconds when alarms are locked.

- Press **Acknowledge/OK** (or if available, carry out a remote acknowledgement) to mute the acoustic alarm sounder.

## **6.5 External warning devices**

The external warning devices used together with the REGARD® 3900 control units are activated via relays in the control unit and are configured according to the individual requirements of the gas detection.

The relays can be configured in different ways:

- Latching relays remain activated (in the alarm status) if an alarm state has occurred, but is no longer present.
- Non-latching relays are deactivated (return to non-alarm status) if an alarm state is no longer present.
- Acknowledgeable relays can be disabled manually (reset to non-alarm status) if the alarm state is still present. This allows external warning devices to be turned off or muted when the alarm state is still present.
- Non-acknowledgeable relays cannot be deactivated when the alarm state is present.
- The alarm locking relays are activated when the internal inhibit switch is moved to the maintenance position. For further information see: "Power and inhibit LEDs", page 31.



**Latching or non-latching**

Settings	Meaning
Latching	<p>The relay must be manually reset after an alarm has been activated.</p> <p>Press <b>Acknowledge/OK</b> or carry out a remote acknowledgement:</p> <ul style="list-style-type: none"> <li>– If the alarm state no longer exists or the relay is acknowledgeable, the relay immediately returns to non-alarm state.</li> <li>– If the alarm state is present, the relay returns to non-alarm state as soon as the alarm state no longer exists.</li> </ul>
Non-latching	The relay automatically returns to the non-alarm state as soon as the alarm state no longer exists.

**Acknowledgeable or non-acknowledgeable**

Settings	Meaning
Acknowledgeable	<p>The relay can be reset automatically if the alarm state exists.</p> <p>Press <b>Acknowledge/OK</b> or carry out a remote acknowledgement - the relay returns to the non-alarm state.</p>
Non-acknowledgeable	The relay cannot be reset manually. The relay automatically returns to the non-alarm state as soon as the alarm state no longer exists.

**6.6****Control buttons (and remote acknowledgement)****Acknowledge/OK**

Acknowledges activated alarms, faults and messages shown on the display. When this button is pressed, depending on the assigned transmitter signal and the control unit settings, the following occurs:

- Alarm and fault LEDs on the control unit go out or start to light up permanently.
- The internal acoustic alarm sounder is muted.
- The messages on the display disappear (e.g. over-range).
- External warning devices remain activated or deactivated depending on configuration.

**Remote acknowledgement**

Remote acknowledgement is a switch that has the same functions as the button **Acknowledge/OK**, but outside the control unit.

**Hold / II / ▲**

Controls the scroll function and switches between the gas type and the measuring range on the display field.

- Press Hold / II / ▲ for less than 1 second to switch display scrolling on/off (if using more than 4 channels).
- Press Hold / II / ▲ for longer than 1 second to toggle between the gas type and the measuring range.

**Only REGARD® 3920**

Using the buttons ▲ / ▼ / **OK** on the REGARD® 3920, you can also navigate to the settings within the integrated configuration menus and select them.

## 6.7 LED and display test

By pressing and holding two control buttons at the same time, the LEDs, the display and the internal acoustic alarm sounder of the control unit can be tested. While the buttons are pressed, all the LEDs light up (the power AC LED only lights up when the corresponding connector), all segments of the display field are filled and the acoustic alarm sounder emits an audible tone.

- REGARD® 3900: Press **Acknowledge** and **Hold**
- REGARD® 3910: Press **OK** and **II**
- REGARD® 3920: Press **OK** and **▲**

This feature can be used if needed for reliability testing of the visual and acoustic output of the control unit.

## 7 Fault elimination and messages

### 7.1 General

<b>Fault</b>	<b>Cause</b>	<b>Remedy</b>
Display shows nothing and all LEDs off	No power supply to control unit	Check the external supply and the wiring and repair
	Faulty energy supply unit	Replace the energy supply unit
	Faulty internal wiring	Check the power distribution internal wiring and repair
Nothing shown on display	No power supply to display PCB	Check that the ribbon cable is connected to the display PCB and all modules, and if necessary, reconnect and replace display PCB
Display shows NO INPUTS	Faulty ribbon cable	Repair or replace ribbon cable
Display shows 4-20 BOARD ERROR or RELAY BOARD ERROR or OUTPUT BOARD ERROR	Faulty input, relay or output module	Replace the faulty module
LED and display test failed	Faulty display PCB	Replace display PCB
"Power DC" LED is not lit, but display is on	Faulty power supply to the control unit	Check the internal or external 24 V DC power supply and repair
	Faulty display PCB	Replace display PCB
Display shows Under-range	Faulty transmitter connector	Check the transmitter wiring and repair
	Loop current incorrect	Re-calibrate
	Faulty transmitter	Replace the transmitter
Display shows Over-range	Short circuit in the remote sensor transmitter wiring	Check the transmitter wiring and repair
	Faulty remote sensor transmitter	Check and repair the transmitter
The "Fault (F)" LED lights up for a single channel	Faulty transmitter wiring	Check the transmitter wiring and repair
	Loop current incorrect	Re-calibrate
	Faulty transmitter	Replace the transmitter
	Faulty input module	Replace input module

<b>Fault</b>	<b>Cause</b>	<b>Remedy</b>
The "Fault (F)" LED lights up for a group of four channels.	Faulty transmitter wiring	Check the transmitter wiring and repair
	Faulty ribbon cable	Check ribbon cable and repair/replace
	Faulty input module	Replace input module
Input module installed, but LEDs do not light up or no data for module on the display	Faulty ribbon cable	Check ribbon cable and repair/replace
	Faulty internal wiring	Check the power distribution internal wiring and repair
	Faulty input module	Replace input module
	Faulty display PCB	Replace display PCB
Control unit displays a different gas value than the remote sensor transmitter	Faulty transmitter calibration	Re-calibrate
	Faulty input channel calibration	Re-calibrate
	Input channel range set incorrectly	Set the same range for the input channel as for the transmitter
The "Fault (F)" LED lights up (constantly) or flashes when a channel is inactive	Configuration error	Move the inhibit switch to position 1, then move back to position 0
Ingress of water	Faulty sealing	Check the sealing ring of the cover, cable entries and the front label and repair
<b>Output module fault</b>	<b>Cause</b>	<b>Remedy</b>
No signal from all outputs; green LED does not light up	No power supply to the module	Check ribbon cable to the module and repair/replace
	Faulty output module	Replace output module
No signal from all or some of the outputs; green LED lights up	Wrong channels selected on the output module	Place the jumper on the correct connections of the output module
The output is constantly at $1 \pm 0.3$ mA.	No signal from the input modules	Check ribbon cable and connect/repair
	Faulty output module	Replace output module
Output constant, but gas value on display changes	Alarms locked	Move inhibit switch back to position 0
Output signal is too low or less than 20 mA	Load resistance too high	Reduce load resistance

Fault	Cause	Remedy
Transfer of configuration to or from the control unit not possible	No power supply to control unit	Check the external supply and the wiring and repair
	Faulty interface unit (RS-232)	Check the interface unit and repair/replace
Display shows a failed calibration	Faulty remote sensor transmitter	Check the transmitter wiring and repair and re-calibrate

## 7.2

### Fault with the Polytron remote sensor transmitter

#### Polytron warning signal

The Polytron transmitter warning signal (every 10 seconds, 1 second long 3 mA) triggers the fault relay (F1) on the input module if the alarm threshold is set above 2.9 mA. If the fault relay is non-latching, the relay changes its status temporarily every 10 seconds at the same time as the warning signal. As the duration of the 3 mA signal is short, the relay may not be triggered each time. For more information, see the instructions for use for the remote sensor transmitter.

#### Polytron maintenance signal

The maintenance signal from older Polytron transmitters (3~5 mA at 1 Hz) triggers the fault relay (F1) on the input module if the alarm threshold is set above 2.9 mA. If the fault relay is non-latching, then it switches over. For more information, see the instructions for use for the remote sensor transmitter.

## 8 Maintenance

Observe EN 60079-29-2 and the relevant national regulations in the country of use.

There are no specific servicing tasks for the REGARD® 3900 control unit.

Carry out maintenance or calibration tasks in accordance with the instructions and the intervals specified in the instructions for use for the remote sensor transmitter.

### 8.1 Configuration and calibration of the control unit

Using the configuration and calibration tools for the REGARD® 3900 control unit, the control unit configuration, including the combination of internal control modules and the settings for the gas detection and warning units, can be displayed and changed. The tools also enable a zero-point calibration and a span calibration.

Configure and calibrate the control unit for all channels during initial installation and, if necessary, during maintenance and repair work on the control unit or the gas detection system.

After configuration or calibration, ensure that all alarms and warning units are operating as intended.

#### Configuration and calibration tools

Use the Dräger REGARD® 3900 configuration software for REGARD 3900 and 3910. The software is a Microsoft Windows-based application and requires an interface unit (RS-232) and a compatible PC. The software and interface unit are available from Dräger. Use the full instructions in the instructions for use provided with the software.

Use the integrated configuration system for the REGARD® 3920. REGARD® 3920 can also be configured with the REGARD® 3900 configuration software as necessary.

### 8.2 Configuration and calibration of a REGARD® 3920 controller

#### 8.2.1 General

Using the configuration system integrated in the REGARD® 3920, the user can view and change the control unit configuration, including the combination of internal control modules and the settings for the gas detection and warning units. The system also enables a zero-point calibration and a span calibration.

Access to the configuration system is password-protected and features two levels of access. The calibration level is used when only one calibration is required. The settings level is used if a change to the control unit settings and a calibration need to be made. The initial passwords for access are listed below. The Settings menu explains how the passwords can be changed.

Navigation:

Button	Feature
OK	Accept menu items and characters
▲	Navigate up/back in the menus and the character list

Button	Feature
▼	Navigate down/forwards in the menus and the character list

Calibration: \_ \_ \_ 1

Settings: \_ \_ \_ 2

To open and use the configuration system:

1. Press ▼ for longer than 1 second and then press **OK**.
2. Enter the password and press **OK** to go to the main menu.

Observe the following when using the configuration system:

- Before configuring the controller, check that all input, relay and output modules are numbered correctly. For further information see: "Numbering the control modules", page 21.
- Alarms are automatically locked if a configuration menu is open.
- Changes made during the configuration are saved automatically.
- The display automatically returns to gas value display if no buttons are pressed for 10 minutes.

## 8.2.2

### Main menu

Feature	Description
<b>Cancel</b>	Returns to normal gas value display
<b>Language</b>	Selects the display language (The Settings menu is always in English)
<b>Information</b>	Opens the information menu
<b>Calibration</b>	Opens the calibration menu
<b>Settings</b>	Opens the settings menu

## 8.2.3

### Information menu

Feature	Description
<b>LED test</b>	Activates the LED and display test. To start and stop the test, press <b>OK</b> .
<b>Names</b>	Displays all channel names (read-only)
<b>Modules</b>	Displays all module types and their versions (read-only).

## 8.2.4

### Calibration menu

With the calibration menu, the control unit can be calibrated for all channels during initial installation and, if necessary, during maintenance and repair work on the control unit or the gas detection system. For instructions on how to calibrate the transmitter; see the instructions for use for the remote sensor transmitter.

Feature	Description
<b>Name</b>	Activates the LED and display test. To start and stop the test, press <b>OK</b> .
<b>Zero-point calibration</b>	Before calibrating the channel, the transmitter must be calibrated to ensure that the output signal of the transmitter is 4 mA with a zero gas value.

Feature	Description
<b>Span calibration</b>	Calibrate the span either by creating calibration gas at the remote sensor transmitter or by influencing the output signal of the transmitter using the transmitter control to simulate a gas signal.

Carry out zero-point calibration:

1. Select **zero-point calibration** for the respective channel.
2. Select **channel calibration**.
  - If the success message is displayed, exit the menu to save the calibration.
  - If an error message appears, observe the information relating to fault elimination.

Creating calibration gas

1. Use a calibration adapter to create calibration gas at the transmitter. Create calibration gas with a concentration between 40 and 90% of measuring range and with the flow rate specified in the instructions for use for the transmitter.
2. Let the measured value on the control unit display stabilise for 2 to 3 minutes.
3. Select the calibration menu of the respective channel.
4. Select **Span calibration > Gas concentration**.
5. Enter the concentration of the calibration gas and select **Calibrate channel**.
  - If the success message is displayed, exit the menu to save the calibration.
  - If an error message appears, observe the information relating to fault elimination.

Control of the transmitter output signal

1. Set the signal output of the transmitter to a value between 10 mA and 20 mA.
2. Select the calibration menu of the respective channel.
3. Select **Span calibration > Signal mA**.
4. Enter the transmitter signal and select **Calibrate channel**.
  - If the success message is displayed, exit the menu to save the calibration.
  - If an error message appears, observe the information relating to fault elimination.

## 8.2.5

### Settings menu

Using the Settings menu and the channel and relay submenus, the combination of the internal control modules, as well as the settings for the gas detection and warning units, can be defined.

Feature	Description
<b>Modules (module)</b>	Displays the module type (mA = input module; Rly = relay module; – = no module). Module 1 and 2 can be an input module or no module. Module 3 and 4 can be an input module, a relay module or no module.
<b>A1 relay</b>	Sets the A1 relay (pre-alarm) with regard to latching or non-latching.
<b>A2 relay</b>	Sets the A2 relay (main alarm) with regard to latching or non-latching.



Feature	Description
<b>Fault relay</b>	Sets the F1 relay (Fault 1) with regard to latching or non-latching.
<b>Channel</b>	Selects the settings for the input channel (4–20) (see chapter A.5.1 on page 34).
<b>Relay</b>	Selects the relay settings (see chapter A.5.2 on page 35).
<b>Passwords</b>	Resets the access passwords.
<b>Date &amp; time</b>	Sets the time and date of the control unit. The date format is YYYY/MM/DD. The time format is HH:MM:SS (when setting the time, the seconds reset to zero).

When using a control unit from the REGARD® 3900 series to detect combustible gases, at least one gas alarm relay must be set to latching to protect against explosion hazards. (See DIN EN 60079-29-1:2007 Potentially explosive atmospheres - Gas detectors - Requirements for the operating behaviour of devices for measuring combustible gases.)

## 8.2.6

### Channel menu

In the channel menu, you can view and configure the input module channels (4–20).

The existing input channels depend on the combination of the internal control modules. In the case of a control unit with 4 input modules (16 input channels), the following channel arrangement would result:

Module 1 - Channels 1–4

Module 2 - Channels 5–8

Module 3 - Channels 9–12

Module 4 - Channels 13–16

#### **WARNING**

##### **Missing alarm**

The deactivation of an input module channel after its assignment to an alarm can cause the alarm to not be activated as desired.

- Do not disable any input module channels after they have been assigned to a single or group alarm.

Feature	Description
<b>Active</b>	Activation ( <b>Yes</b> ) or deactivation ( <b>No</b> ) of the channel.
<b>Name</b>	If necessary, enter a unique name/number for the channel (up to 16 characters).
<b>Gas name</b>	Enter the gas name (up to 6 characters).
<b>Gas unit</b>	Enter the gas units (up to 4 characters).
<b>Range</b>	Select the measuring range from the list (user-defined ranges are not possible). If a measuring range is selected, the alarm thresholds for A1 and A2 are automatically set to 20% and 40% of the range. The table below shows the measuring range, resolution (increment) and decimal places for the alarm thresholds of A1, A2 and A3.

Feature	Description
<b>A1/A2/A3 alarm</b>	Enter a <b>threshold</b> for the alarm of between 4% and 100% of measuring range (if A3 is set to zero, alarm A3 is switched off). Also select <b>Rising</b> or <b>Falling</b> , in order to determine whether the alarm should be activated for rising or falling gas values.
<b>F1/F2 alarm threshold</b>	Enter a fault alarm threshold between 1 mA and 3.8 mA (if F2 is set to zero the F2 alarm is switched off).

Range	Resolution	Decimal places	Range	Resolution	Decimal places
0–1	0.01	2	0–25	0.1	1
0–2	0.01	2	0–30	0.1	1
0–3	0.01	2	0–50	0.1	1
0–4	0.01	2	0–75	0.1	1
0–5	0.01	2	0–100	1	0
0–6	0.01	2	0–200	1	0
0–7	0.01	2	0–250	1	0
0–8	0.01	2	0–300	1	0
0–9	0.01	2	0–500	1	0
0–10	0.1	1	0–1000	5	0
0–11	0.1	1	0–2000	5	0
0–12	0.1	1	0–3000	10	0
0–15	0.1	1	0–5000	10	0
0–20	0.1	1	0–9999	25	0

### 8.2.7

#### Relay menu

In the relay menu, you can view and configure the relay module relays.

Relay 1 and relay 9 are preset system error relays and cannot be configured. Relays 2–8 and 10–16 are configurable. The existing relays depend on the combination of the internal control modules. In the case of a control unit with 2 relay modules (16 relays), the following relay arrangement would result:

Module 3 - Relay 1–8

Module 4 - Relay 9–16

Feature	Description
<b>Feature</b>	Activation ( <b>Yes</b> ) or deactivation ( <b>No</b> ) of the channel.
<b>Channels</b>	Is only required for single or group alarms. <b>Single alarm</b> - select channel from the channel list. <b>Group alarm</b> - specifies how many channels of a group are required to trigger the alarm: [Number of channels to trigger the alarm] of [total number of channels in the alarm group]. Then select the channels from the channel list.

Inactive channels are shown with a dotted selection field.

If the selected channels does not correspond to the number of required channels for the group alarm group, the user is displayed a message regarding this.

Create a common alarm for a group of N channels with the relay configured as a group alarm 1 of N and the corresponding channels defined in the group alarm group.

The following settings are only required for common, single and group alarms.

Feature	Description
<b>Alarm type</b>	Selects the desired alarm or fault (A1, A2, A3, F1 or F2).
<b>Activation mode</b>	Selects whether the relay is activated during an alarm or activated in normal state.
<b>Latching</b>	Selects whether latching or non-latching.
<b>Acknowledgeable</b>	Selects whether acknowledgeable or non-acknowledgeable.

## 9 Disposal



This product must not be disposed of as household waste. This is indicated by the adjacent symbol.



You can return this product to Dräger free of charge. For information please contact the national marketing organizations or Dräger.

## 10

## Technical data

**Versions with operating console (REGARD® 3900 and 3920)**

Dimensions	415 x 305 x 175 mm
Weight	approx. 5 kg
Material	ABS-VO
Degree of protection	IP65
Cable entry	M20 (qty 30)

**All versions**

Cable x-section	Max. 2.5 mm <sup>2</sup> Min. 0.5 mm <sup>2</sup>
AC input voltage (to energy supply unit)	Typical: 98 to 253 V AC, 50 to 60 Hz
AC power consumption	
2 A energy supply unit	Typical: < 0.5 A; max. 0.5 A
5 A energy supply unit	Typical: 0.5 A; max. 1 A
10 A energy supply unit	Typical: 1 A; max. 2 A
DC input voltage	18 to 30 V DC
DC power consumption at 24 V	
Input module:	60 mA with the exception of the transmitter
Relay module:	200 mA
Output module:	300 mA
Display:	170 mA
Interface unit (RS-232):	50 mA
Readings and acoustic signals	Readings: LEDs and display Acoustic signals: Acoustic alarm sounder
Storage temperature	-25°C to +70°C
Operating temperature	0 to +55°C
Relative humidity (RH) during operation and storage	REGARD® 3900/3920: 0 to 100%, non-condensing REGARD® 3910: 0 to 95%, non-condensing
Warm up time	< 40 s
Response time	< 2 s
Measurement accuracy	Within 1% of the measured value
Module mounts	M3

**Relays (all modules)**

Type	Zero potential, single pole changeover relay
Contact material	Silver alloy
Nominal switching capacity	5 A 250 V AC; 5 A 30 V DC
Max. switching power	1250 VA; 150 W
Switching voltage	Max.: 250 V AC; 100 V DC Min.: 10 V
Switching current	Max.: 5 A Min.: 100 mA

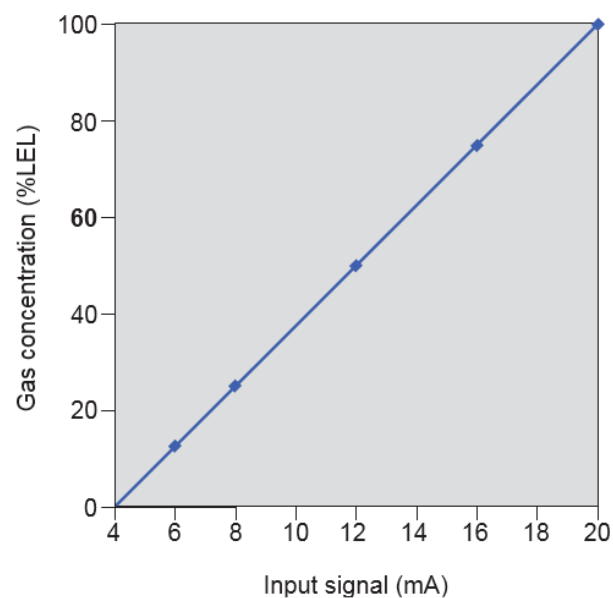
**Output module**

Output range	0.1 to 21.7 mA
Insulation	50 V
Resolution	0.1 mA
Accuracy	Within 1% of the input signal (minus zero terminal)
Maximum load	500 $\Omega$
Storage temperature	-25°C to +70°C

#### Transfer function

Input signal	Indication on the display
> 20.0 mA	Over-range
4.3 to 20 mA	Linear gas measurement in accordance with selected range
3.7 to 4.3 mA	0
< 3.7 mA	Under-range or Maintenance, depending on the fault alarm threshold


Measurement of gas concentration for 0–100% of the lower explosive limit (LEL)



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## 11

## Order list

 The components of the REGARD® 3800 series are not compatible with the REGARD® 3900 series.

Description	Quantity	Order number
REGARD® 3900 (Operating console with display PCB)	1	4208780
REGARD® 3910 (Frame group with display PCB)	1	4208830
REGARD® 3920 (Operating console with display PCB)	1	4208850
Display PCB (REGARD® 3900 and 3910)	1	4208781
Display PCB (REGARD® 3920)	1	4208856
Input module	1	4208782
Relay module	1	4208784
Output module	1	4208797
	1	
Dräger REGARD® 3900 configuration software	1	4208804
Interface unit (RS-232)	1	4208785
REGARD® 3910 aisle installation kit		6814100
Ribbon cable	1	4208750
Long power cable (Energy supply unit to module)	1 (pair)	4208792
Short power cable (module to module)	1 (pair)	4208791
Grounding plate	1	4208777
Mounting bracket	1	4208796
Instructions for Use (English)	1	4208800
Instructions for Use (German)	1	4208801
Instructions for Use (French)	1	4208802
Instructions for Use (Spanish)	1	4208803

# 12 Declaration of Conformity




## EU-Konformitätserklärung EU-Declaration of Conformity

Dokument Nr. / Document No. 4209434\_08

Wir / we

Dräger Safety UK Ltd, Riverside Business Park, Blyth, Northumberland, UK

erklären in alleiniger Verantwortung, dass das Produkt  
declare under our sole responsibility that the product

**Gasmesszentrale REGARD 3900, 3910, 3920**  
Gas Detection System REGARD 3900, 3910, 3920

mit der EG-Baumusterprüfbescheinigung / Expertise  
is in conformity with the EC-Type Examination Certificate / Expertise

TÜV 19 ATEX 8400 X  
MED B000010B

ausgestellt von der benannten  
Stelle mit der Kenn-Nr.  
issued by the Notified Body  
with Identification No.

TÜV Rheinland Industrie Service GmbH  
Am Grauen Stein  
51105 Köln  
Germany  
0035

DNV GL SE  
Veritasveien 1  
1363 Hovik  
Norway  
0575

und mit den folgenden Richtlinien unter Anwendung der aufgeführten Normen übereinstimmt  
and is in compliance with the following directives by application of the listed standards

Bestimmungen der Richtlinie provisions of directive		Nummer sowie Ausgabedatum der Norm Number and date of issue of standard
2014/34/EU	ATEX-Richtlinie ATEX Directive	EN 60079-29-1:2016
2014/90/EU <sup>1)</sup>	Schiffsausrüstungs-Richtlinie Marine Equipment Directive	EN 60079-29-1:2007 IEC 60092-504:2016, IEC 60533:2015
2014/30/EU	EMV-Richtlinie EMC Directive	EN 50270:2015
2014/35/EU	Niederspannungs-Richtlinie Low Voltage Directive	EN 61010-1:2010
2011/65/EU (EC)	RoHS-Richtlinie RoHS Directive	EN 50581:2012

<sup>1)</sup> gültig für / valid to Regard 3910

Überwachung der Qualitäts-  
sicherung Produktion durch  
Surveillance of Quality Assurance  
Production by

INTERTEK Italia S.p.A.  
Via Guido Miglioli 2/A  
20063 Cernusco sul Naviglio -  
Milano (MI)  
Italy  
2575

DNV GL SE  
Brooktorkei 18  
DE-20457 Hamburg  
0098

Blyth, 2019-09-03

Ort und Datum (jjjj-mm-tt)  
Place and date (yyyy-mm-dd)

B Wade  
Director of Quality & Regulatory Affairs




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Subject to change

[www.draeger.com](http://www.draeger.com)

